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The Improvement of Villages.

A LADY interested in the development and improvement of her town, and recently appointed one of the managers of a newly organized Village Improvement Society, writes to ask in what way she can best exert her influence to further the aims which the founders of the Society had in mind when it was created; or, in other words, what she and her associate Directors can do to improve the sanitary condition and the appearance of the town. It is situated in New England not far from one of the smaller cities, and it has long been famous for its rural beauty. The township is large, and contains a number of villages. A part of the population, living at one extremity of the town, is almost exclusively devoted to manufacturing, while other parts are occupied by the expensive villas of many summer residents. The population is unusually heterogeneous. The increase of the manufacturing population and the influx of persons seeking summer homes have had the inevitable result; and the improvements of recent years, to use a familiar, but not always a very appropriate, expression, have destroyed a great deal of the rural and sylvan charm which once made this town beautiful, and desirable as a place of residence. The inhabitants, naturally, are now anxious to do something to restore the lost beauty, or, at least, to preserve that which remains, and to adopt some general scheme of improvement suited to the changed conditions of the town and to the changed requirements of its inhabitants. It is not, of course, practicable, or within our sphere, to give a specific plan of improvement for any particular town or property; and all that is expected of us in this particular case is some general statement calculated to provoke discussion and the consideration of the general principles which seem to underlie the whole question of rural town-improvement.

The object of the founders of Village Improvement Societies is clearly to improve the sanitary condition of towns and their general appearance, and in this way to improve the well-being of the inhabitants, and then to elevate their intelligence, stimulate their love of Nature and develop their artistic feelings. The first requisite for the accomplishment of this purpose is to secure for the people of the town an abundant supply of pure water and a good system of sewerage-removal for the villages and for the isolated dwellings. These are the principal requisites for insuring the health of a community. This being accomplished, the preservation of natural scenery and rural beauty, the improvement of roads, the planting of shade trees, the decoration of public squares, the beautifying of school-grounds and the surroundings of railway-stations, the removal of obnoxious and unauthorized advertisements, the practice of thrift and neatness, should all in turn occupy the attention of the officers of the Improvement Society.

No one will deny that these things are necessary and important, or that a town in which such matters are carefully looked after is a much better place to live in than the ordinary American village. But how can these improvements be brought about? How is an independent body of industrious, public-spirited and intelligent individuals to make themselves felt in the administration of the affairs of a large town? It is evident that they must rely upon some method of more general application than those adopted by societies of this character in small country towns, in which a few men and women are permitted to plant trees at their own expense, and to see that no injury comes to them after they are planted. For this is what the Village Improvement Societies meant in their early days in many small New England villages.

The executive committee of a society, however large its membership, could hardly operate with any prospect of success in a thickly populated town covering many square miles of territory by any direct personal process; and it seems to us that its only chance of success lies in its ability to impress its ideas upon the community through the education of public sentiment. A society working independently—that is, undertaking to improve a town, or any part of it, at their own expense—would find themselves at once in conflict with the local town officials, and this conflict of authority would necessarily injure their efficiency and usefulness. The sphere of such a society to be really useful must be educational, and must depend on the increased intelligence of the community for obtaining from the town officers and from the citizens themselves the improvements good taste and the highest interests of the town demand. The directors of a society will find more than enough to occupy their time if they approach the subject from this direction, and they will find, too, that progress based on popular intelligence will be more permanent and more satisfactory than if it is the result of isolated individual effort.

The first duty of the officers of the society to which we have referred is to raise from their public-spirited fellow-citizens a good round sum of money, for education and reform cost money; having secured this, let them begin an educational crusade against popular ignorance and indifference to everything connected with public health, convenience and taste. Let them combat this ignorance and this indifference in every way in their power—by the diffusion of sound advice through the press and by special publications, through the lips of clergymen and school-teachers, by popular lectures, and by all the other methods which, once set in motion, have never yet failed to quicken the pulse and stimulate the intelligence of the American people.

This is the way, and the only way, in which an individual or an association of individuals in one of our communities can make its influence felt in a lasting manner. And this is the advice we offer to our correspondent. Make yourself and your co-workers educators in the first place, and then censors; and when anything is done in your town which is calculated to injure it or the welfare of its inhabitants, let the fact be known in such a way that there can be no mistake about it. Your influence will increase and spread, and gradually but surely you will ac-

complish what you desire, and make your town a credit to its inhabitants and a delight to the stranger within your gates.

Pruning Shrubs.

OUR climate is so favorable to the growth of hardy deciduous shrubs that these should play an important part in every American garden, especially in the Northern and Eastern States. A small garden can be made very attractive with a proper selection of shrubs alone from opening spring, when the earliest of them are in bloom, until they glow with the rich colors of their autumn foliage, and even later still, for many of them are covered with bright fruit far into the winter. When properly planted in deep, rich soil they demand comparatively little care, although a mulching with coarse litter is a help to many varieties, and an occasional light dressing of decomposed manure, or of bone-dust and ashes will often prove beneficial.

But how shall they be pruned? As a rule, the knife should be used with caution—not to "trim them into shape," as the phrase goes, but to encourage their development into the best typical form. Severe pruning tends to enfeeble either shrub or tree, and the removal of large branches usually interferes with the natural and, therefore, most graceful outlines of either. So far as any general rule can be laid down, it may be said that shrubs will be the most vigorous and in their best form the year through, when no pruning is attempted beyond the thinning out of the weaker and overshadowed branches in order to afford the stronger ones a better opportunity for growth. Shrubs have a beauty in winter as well as when they are in full foliage or flower. In the leafless season a mass of shrubbery is enveloped with a haze of delicate color which comes from the melting together of the different tints of the bark of the small branches; and this color, together with grace of form, that in shrubs which is quite as distinct in winter as in summer, can be destroyed by careless cutting. The shearing of shrubs into formal shapes, such as cones and spheres, or cutting off all the tops at the same level, means, of course, the destruction both of the health and beauty of the plant.

But when shrubs are used for special purposes they require special treatment. If abundant bloom is the object chiefly aimed at, the time and manner of pruning should be chosen with this end in view. Shrubs which bloom early in the spring, like Thunberg's Spiræa, for example, form their flower-buds on the growth of the previous year. If this growth is cut back in autumn or in early spring, the flower-buds, too, are cut away and the bloom of the year is destroyed. With such shrubs the proper course is to wait till the flowering season is over and then prune away a considerable portion of last year's wood. This will encourage new shoots, which will start at once and begin to make flowering branches for next spring. On the other hand, shrubs which flower late in the season, like the Rose of Sharon, some of the Tamasisks and the Great Panicled Hydrangea, make their flower-buds on the wood that forms during the growing season of the same year. These late-flowering shrubs should be pruned now, before the new growth starts. If the Hydrangea just mentioned is cut back so as to leave but one or two eyes on each branch of last year's growth, these will put out vigorous shoots, each of which will bear at the extremity a large panicle of flowers next fall.

These directions may be summarized as follows:

For general purposes, shrubs should never be cut back so far as to impair their vigor, nor be pruned so as to destroy their natural outlines.

Shrubs which bloom early, on wood of the previous year, should not be pruned in autumn or in early spring when it is desired to secure abundant flowers, but immediately after the blooming season.

Shrubs which bloom late, on wood of the current year, should be pruned after the leaves fall in autumn, or in early spring before they start.

THERE is no insurmountable difficulty in protecting the forests upon the national domain or those in the Adirondack region of this state, if the Congress of the United States and the Legislature of New York will give to this subject the serious consideration which its importance requires. But popular legislative bodies only reflect popular demands, and if we are to have forest-preservation in this country it will be because the people of the United States, instructed in the material requirements of their country, insist upon it. The Executive Committee of the Horticultural Society, of Newton, Massachusetts, in recently passing a resolution, which we gladly publish, expressive of intelligent concern for the preservation of the forests and of sympathy with all efforts directed to that end, set an example which might well be followed by other bodies of men, whether they are tillers of the soil or not, who are interested in the future of the United States. If every organized society in the country will pass resolutions upon this subject, if every newspaper will publish and endorse them, and if every man and woman will use his or her influence in bringing the subject of forest-preservation to members of Congress, personally and by petition, sooner or later the country will be saved from those special and particular evils which the extermination of the western forests will bring upon it:

Resolved: That the Newton Horticultural Society desire to express, through the medium of the public press, their entire satisfaction in the efforts that are now being made to awaken the people to the great importance of preserving the forests throughout our country. In New England, and especially in northern New Hampshire, as well as in other regions, the forests are fast disappearing before the axe of the logger.

Not only are certain districts thus robbed of their chief attraction to lovers of natural scenery, but the value of the streams, which take their rise among them, for manufacturing purposes, is seriously impaired, not only by the droughts but by the inundations thereby produced. Our countrymen, generally, must be educated up to a knowledge of the important truths which so vitally concern them, and we therefore cordially welcome every effort, however humble, to bring about so desirable an end.

Especially do we recognize the value of the weekly diffusion of knowledge on forestry in all its relations to the interest of the people, made by Garden and Forest. Could its articles on this subject be more widely diffused and brought to the notice of the capitalist, the farmer, the contractor, the builder, in fact, every one, the result would be most satisfactory.

It would be unwise to sit down and close our eyes against matters which so intimately concern ourselves as well as coming generations; we, therefore, as members of a society designed to foster and promote a love for the beautiful and useful in Nature, would entreat our fellow citizens and countrymen to give new and persistent attention to all that concerns the preservation of the forests.

The Garden (London) recently republished in full the admirable "Hints About Lawns" which Mr. J. C. Olmsted wrote for Garden and Forest; and an accompanying editorial note read as follows: "If landscape-gardening were as true and clear as the above sketch, that art would not now be the horror it is to sensitive men." In justice to Mr. Olmsted, to his famous father and to other American landscape-gardeners, it should be explained to our English contemporary that their art, as practiced here, is by no means a horror even to the most sensitive eyes. Horror is excited only when the land-owner himself tries to do an artist's work, or when he mistakes for an artist some one who has no better title to the name than lies in the fact that he can grow plants successfully.

Some idea of the wonderful growth of trees in the fertile soil of California—a growth which seems almost fabulous to persons living in less favored regions—will be gathered from the following statement printed in a recent issue of the *Pacific Rural Press*. The trees are in Antelope Valley, in Colusa County, and have not been irrigated. A Fig-tree, planted in 1874, has a top thirty feet high by thirty feet

through, with a trunk five feet seven inches in circumference at the smallest part, which is two feet from the ground. A California Walnut (*Juglans Californica*), planted in 1882, is twenty-five feet high, with a head twenty-five feet through, and a trunk diameter of twelve inches. An English Walnut, planted in 1884, is sixteen feet high, with a trunk six and one-half inches in diameter.

The Art of Gardening.—An Historical Sketch. II. —Egypt.

IF we wish distinct proof in support of the belief that man's love for art developed before his love for nature and that he practiced architecture in advance of gardening, we may find it in the fact that all the early gardens of which we have any accurate knowledge were formally, architecturally arranged. Egyptian gardens are portrayed in many paintings and bas-reliefs, succinct and conventional, of course, in treatment, but easily deciphered and clear in the witness they give to the rigid formality of the Egyptian style. Although the civilization portrayed in these pictures is the earliest of which history, as distinguished from mere legend, speaks, it was already highly developed and must have existed for many ages. And when we remember the physical character of the land, with its burning sun and level plains, devoid of all that picturesqueness of surface and that richness in large vegetable forms which other countries exhibit, we can easily believe that gardening art was widely practiced on the banks of the Nile. Temples were surrounded with gardens; the rich Egyptian lived in country houses encircled by larger ornamental demesnes, and gardens existed in which the architectural factors were of accessory, not primary, importance. But whatever the size of the enclosure, it must have been formally disposed. Such was the case in all ancient lands, but there were especial reasons why it should have been the case in Egypt.

Local taste, as every relic we possess declares, ran emphatically in the direction of symmetry in all forms of art. And we can understand why if we glance at the physical aspect of the land. It is, so to say, Nature's most formal, symmetrical creation, with its single wide river, its vast level plains, and those bordering mountains which are but perpendicular walls of rock. Picturesqueness is nowhere suggested—Nature did not teach the Egyptian what its charms might be, nor reveal to him the beauty of variety. Although a multitude of minor plants grew, of course, in his fertile soil, trees were present in but few varieties, and everywhere order, balance, sobriety, and a persistent, if splendid, monotony of outline met his eye. Even to-day, with all our preference for landscape-gardening properly so-called, we feel that a large measure of formality would be prescribed in Egypt by the dictates of Nature herself. Here one does not desire an outlook into the distance so much as to seclude one's self from its sameness behind barriers which allow the imagination to believe that variety may lie beyond them. Here the chief essentials are coolness and shade. But no brooks exist; to simulate natural ponds would be too gross and palpable a deception—the formal basin is really the most natural expedient. As all vegetation must be irrigated, and as in its larger forms it is supplied in no great variety, both convenience and beauty are best served by a symmetrical disposition of the plants. And, in general, only a garden with a distinct element of architectural stability and grandeur would seem in harmony with the outer world. If we feel this to-day, how much more must the Egyptian have felt it to whom experience had revealed no other kind of beauty? As he naturally evolved the most solid and most symmetrical kind of architecture that the world has seen, so, too, he naturally created only formal, architectural gardens.

The common type of temple-garden is, of course, the one most frequently shown in Egyptian picture-records. It was not so much a place into which men could escape from the imprisonment of walls and roofs as an adjunct to the beauty of the building—a stately court-yard surrounded by high barriers and planted with rows of trees which seem often to have grown in pots. Avenues of trees must likewise have formed the approach to the temples, obelisks, sphinxes and other sculptured monuments mingling with their more pliant forms. Thus, for example, we may picture the great sphinx-avenue which leads for more than a mile between the temples of Luxor and Karnak, now a waste sandy stretch lined by headless figures, but once verduous under foot and shaded by tall Palms or Sycamores.

Other pictures show us gardens of more importance lying around palace or temple, with wide parterres, long rows of umbrageous trees, groups of Palms and great basins and canals flowing with water; and one picture at least on the wall of a Theban tomb, shows a villa-garden in which architectural elements by no means prepondrate. It is a great square walled enclosure, lying close to a river—the Nile, of course, as there was no other—from the banks of which steps lead up to the only entrance, a noble gate. On the opposite side of the garden, near what we may call its back wall, stands the villa. To right and left of the entrance are great longitudinal basins of water, while two others, of a square shape, lie further back. The side walls are lined with trees, between each pair of which a vine is trained against the wall, and outside the front wall, close to the river, runs a row of trees evidently of exceptional size. The centre of the garden is occupied by a vineyard, divided by paths into seven sections, which is encircled by its own wall and fills perhaps a third of the whole area. And all the remaining portions are sub-divided into regular sections, amid which kiosks and shelters are arranged, filled with various kinds of plants in masses. Several different species of trees are indicated, and among them we may divine the Sycamore and the Date Palm, while in other spots we see great groups of rush-like foliage, and the basins hold aquatic plants. This, indeed, must have been a spot where man could refresh himself in seclusion and peace; yet nothing could well be more formal, more architectural in design.

A picture which was discovered by Champollion and is now in the Louvre, shows a garden surrounded by a wooden wall, and again lying by the river between which and the wall stands a row of trees cut into spherical forms. In the centre of the enclosure is a great arbor of vines, encircled by a double row of Palm-trees, while in other parts square pools and symmetrical parterres of flowers are indicated, and an open kiosk of four rooms covered with vines. In other pictures we see trees clipped into columnar shapes, and in all we realize the natural desire of everyone who built a garden to place it close to Father Nile.

The chief shade-tree of the Egyptians was the Sycamore—of course the true Sycamore, *Ficus sycamorus*, and not one of the very different trees which in modern Europe and in America are called by this name. The Date Palm must have been equally conspicuous, valued for its fruit as well as for its beauty, and harmonizing well in its graceful yet stately lines with the architectural forms about it. The Doum Palm (*Hyphæne Thebaica*), the Acacia, the Carob-tree (*Cratonia siliqua*) the Almond, the Pomegranate, the Myrtle and the Laurel were also familiar trees; the Vine was everywhere present; and a wall-picture of the eighteenth dynasty shows us an apartment in which ornamental foliage-plants are growing in pots.

It is probable that lawns and parterres of grass were unknown in Egyptian gardens—in no hot southern land can they ever have been perfected. But their place was supplied by flat parterres of flowering plants, which, it is in harmony with all we know of Egyptian taste to believe, formed carpet-like patterns of vivid colors. Of course such patterns were entirely appropriate when the design of a garden was formal; the Egyptian feeling for color was so well developed that we must fancy them peculiarly beautiful in the grouping of their tints; and never can they have had so admirable an effect as here, where the architectural forms they encircled were painted in conspicuous designs with bright blue and red and green.

New York. *M. G. van Rensselaer.*

The Cedar of Lebanon.

THE Cedars of Mount Lebanon are, perhaps, the most renowned and the best known natural monuments in the world. Religion, poetry and history have all united to make them famous. Distinguished travelers and men of science have visited them, and their story has been told over and over again. There are, however, grave doubts, at least, whether the Cedar so often mentioned in the Bible was the tree now called the Cedar of Lebanon; and the forests which Solomon cut to rebuild the Temple were, perhaps, composed of Junipers or of some other tree with more durable wood than that of the Cedar. There is no doubt, however, that the Cedars of Lebanon in more modern times have been objects of veneration. Belon, the author of the first work upon Conifers ever written, visited Syria in 1550, ascended Mount Lebanon, and visited the Monastery of the Virgin Mary, situated in a valley below the grove of these trees where the festival of the Transfiguration was held. For this solemnity the Marmites—a Christian sect inhabiting Mount Lebanon—with many pilgrims, repaired to the grove. The night before was celebrated in dancing and feasting by the light of fires built with branches cut from the

Cedars. The following day the Patriarch celebrated high mass upon an altar erected under one of the largest of the trees, which, we are told, were planted by the hand of King Solomon himself, at least this is the story related to the faithful; and "that the Patriarch officiated pontifically on this solemn occasion; that his followers were particularly mindful of the Blessed Virgin on this day, because the Scriptures compare her to the Cedars of Lebanon; and that the same Holy Father threatens with ecclesiastical censure those who presume to hurt or diminish the Cedars now remaining,"—an injunction which does not seem to have been very strictly obeyed, for the number of very old trees in this famous grove has been steadily diminishing ever since. Belon found twenty-eight of them standing at the time of his visit. Thévenat a century later found twenty-three. Only sixteen large trees were seen by Maundrell in his journey from Aleppo to Jerusalem, made in 1696, although he found many small trees growing near them. The number of the large trees continued to gradually diminish, if the reports of travelers are to be believed, from this time, although the grove being protected more or less successfully from fire and from sheep and goats, the young trees increased. In the middle of the last century there were twelve of the old trees remaining, and between four and five hundred smaller ones of all sizes. Dr. Pariset, who visited Mount Lebanon in 1829, found the grove in substantially the same condition as when Dr. Pococke had seen it eighty years earlier.

But the most experienced observer who has ever seen the Cedars on Mount Lebanon is Sir Joseph Hooker, who visited Syria in the autumn of 1860, for the purpose of examining the grove, in regard to which little was known scientifically up to that time. A very interesting account of this visit was published in the *Natural History Review* in January, 1862, with the author's views upon the specific rank and the origin of the different species or forms of the genus. The elevation of Mount Lebanon was found to be 10,200 feet, and that of the valley, where the trees are growing, 6,200 feet. "The number of trees," to quote from this article, "is about 400, and they are disposed in nine groups, corresponding with as many hummocks of the range of moraines; they are of various sizes, from about eighteen inches to upwards of forty feet in girth; but the most remarkable and significant fact connected with their size, and consequently with the age of the grove, is that there is no tree of less than eighteen inches girth, and that we found no young trees, bushes or even seedlings, of a second year's growth. . . . . The position of the oldest trees (of the 400) afforded some interesting data, relative to the ages of the different parts of the grove, and the direction in which it had lately spread. There were only fifteen trees above fifteen feet in girth, and these all occurred in two of the nine clumps, which contained 180 trees. Only ten others exceeded twelve feet in girth, and these were found in immediately adjoining clumps, one on one side and one on the other of the above mentioned. There were five clumps containing 156 trees, none of which was above twelve feet in girth, and these were all to the westward (or down-valley) side of the others. On this side, therefore, the latest addition to the grove has taken place."

One of the old Cedars of Mount Lebanon appears upon page 149. The illustration is made from a photograph taken upon the spot and communicated to us by Mr. Francis Skinner, of Boston. It was supposed, until comparatively recent times, that all the Cedars left upon the earth were in this famous grove, but now they are known to occur upon different chains of the Taurus, where, with *Abies Cilicica* and *Juniperus fœtidissima*, they form extensive forests; while as late as 1865 Mr. Jesup, an American missionary, discovered five large groves in the Lebanon itself, three east of 'Ain Zahalteh, in the southern Lebanon, one of which was said to contain 10,000 trees. Other groves were also discovered at this time, so that upon the Lebanon alone the Cedar is known in ten distinct localities. The same tree, or one hardly to be distinguished from it by any of the characters which botanists consider valuable, *Cedrus Atlantica* occupies the mountain ranges of Constantine, the western province of Algeria, bordering upon Tunis, and abounds on the eastern Atlas ranges. They characterize the upper mountain zone between 5,200 and 7,200 feet, and approach to within twenty miles of the sea. Cedars, too, were found upon the mountains of Cyprus after the recent English occupation of the island, which only differ from those of the Lebanon in the shortness of their leaves, and which serve to form an important link between those of Asia Minor and of the Atlas. West of the Lebanon, at a distance of 1,400 miles, or nearly the same distance as that which separates the Atlas from the Lebanon, occur the great Afghanistan forests of *Cedrus Deodara*, which extend eastward along the Himalaya almost continuously to Nepal, occupying various elevations between 4,000 and 12,000 feet, and in Afghanistan outnumbering all other Conifers in the number of individuals. The Deodar, or "Tree of God" of the Hindoos, is one of the most valuable timber-trees of the Himalaya.

Sir Joseph Hooker states in the paper from which we have already quoted that "the African Cedar differs from that of Lebanon in having a perfectly erect, rigid leader, and straight, stiff ends to the branches, all of which in the Lebanon plant droop more or less. In the African the cone is generally smaller, the leaves shorter and more glaucous, and the scales and seeds triangular in form (instead of quadrangular). There are two forms of Cedar in Algeria as in Taurus, and characterized by the same differences in each country—viz., a greener long-leaved, and a more silvery short-leaved variety. The *C. Deodara* has a much more pendulous leader and ends to its branches, and longer leaves of a more glaucous hue than *C. Libani*, though not such silvery leaves as the *C. Atlantica*. The cones are as large as those of *C. Libani*, but the scales and seeds are the same form as those of *C. Atlantica*, and hence markedly different from those of *C. Libani*. . . . It should be added that there are no other distinctions whatever between them—of bark, wood, leaves, male-cones, anthers or the structure of them—nor in their mode of germination or duration, the girth they attain, or their hardiness."

The conclusion reached by Sir Joseph is that the three Cedars are well marked forms, generally distinct, but occasionally approaching or passing into one another, and all derived from one common parent.

The Cedars are related botanically to the Larches and to the Firs. Their stiff, awl-shaped leaves are produced like those of the Larch, from very short lateral branches, but unlike those of the Larch, they are persistent. The cones are upright, with deciduous scales like those of the Firs, but they are much larger, and are composed of broad and rounded, closely imbricated scales, and do not mature until the end of the second or sometimes the third season.

The Cedar of Lebanon was planted early in British gardens. The exact date of its introduction seems uncertain, although it is probable that it was about 1680, and that the famous trees of the Chelsea Botanic Garden were really the first. A good deal of conflicting testimony, however, has been produced at different times upon this subject.

Bernard de Jussieu carried from London in 1734 the first specimen planted in France; unless, as has been suggested lately, Belon really brought the Cedar to France from Syria at the time of his visit in the middle of the sixteenth century. Jassieu's tree is growing where he planted it in the *Jardin des Plantes*, and is still healthy and vigorous.

No foreign tree perhaps has ever been more generally planted in England during the last two centuries, and thousands of noble, wide-branching old specimens, scattered from one end of the kingdom to the other, are among the most impressive objects in many stately parks and pleasure grounds.

Our illustration upon page 151 will serve to show the Cedar of Lebanon as it appears in England. It is a view of one of the most famous country places, Wilton House, near Salisbury, long the home of the Pembrokes, where lived the lady whom all the world knows through old Ben Jonson's epitaph as "Sidney's sister, Pembroke's mother." Here it was that this lady's brother, Sir Philip Sidney, wrote the "Arcadia," and although he died a century before the first Cedar was planted in England, Wilton House in those days must have possessed many of the features which has since made it famous. "The shading woods, . . . the rocks, woods, hills, caves, dells, meads and brooks" which answered the poet's sigh for his absent "Stella."

Here in the United States the Cedar of Lebanon is not often seen. It is not hardy in New England, where, perhaps, more attention has been paid to the cultivation of exotic trees than in other parts of the country; and although a few good specimens may be seen in the neighborhood of this city and of Philadelphia, where the tree seems to be hardy enough when once established, the number is not large, and it does not seem to have been a favorite with planters. It is not known who first planted the Cedar in the United States. Mr. Downing, in his "Landscape Gardening," published in 1849, speaks of a specimen in the grounds of Mr. T. Ash, at Throggs Neck, in Westchester County, in this State, as the finest in the Union, being at that time fifty feet high. It would be interesting to know if this plant still survives. The specimen planted at Woodlawn, near Princeton, New Jersey, by the late Judge Field in 1842, and now the property of Professor Marquand, was thirty-six feet high in 1859, and is now fifty-four feet high,

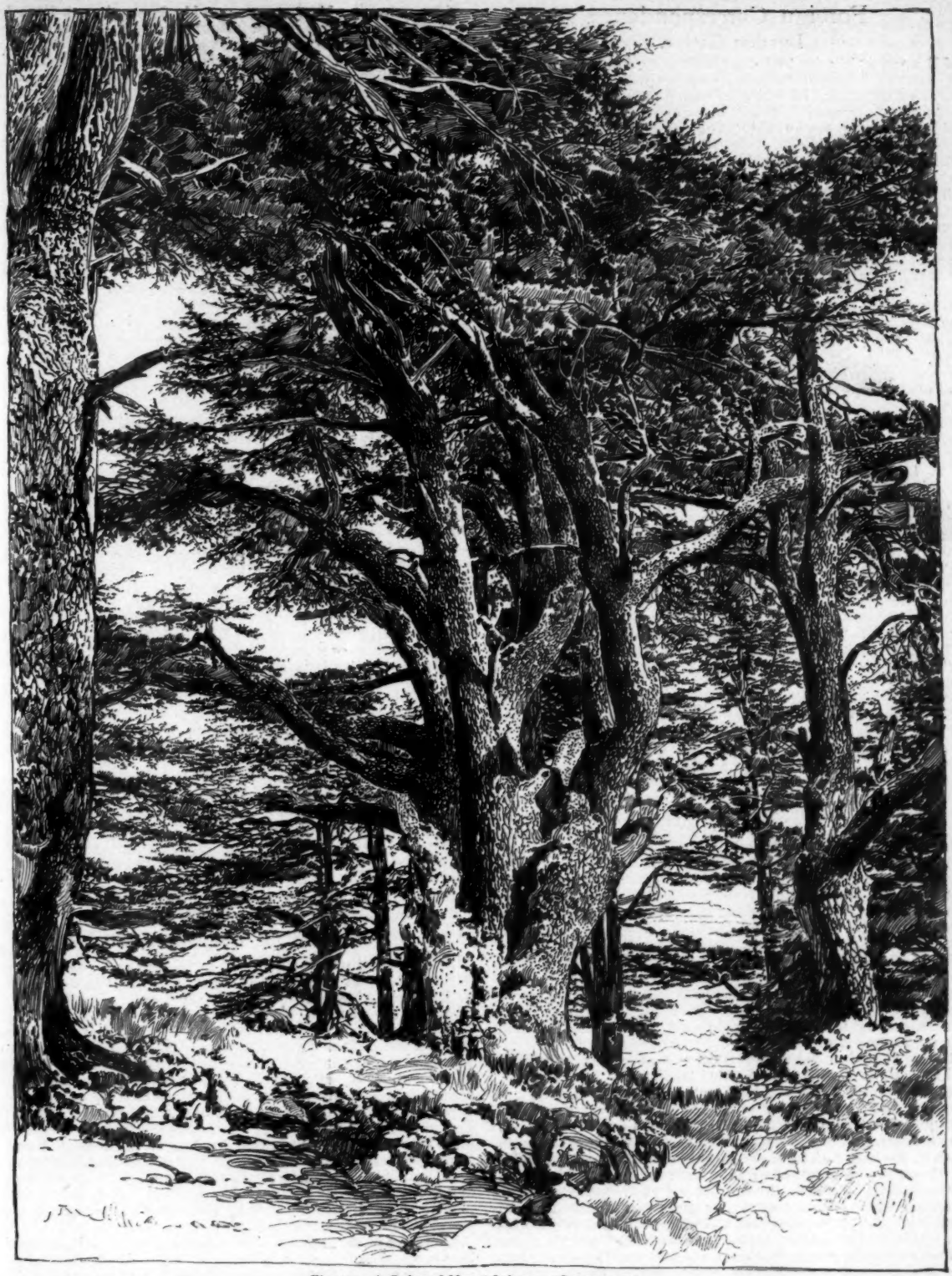

Fig. 101.—A Cedar of Mount Lebanon.—See page 147.

with a trunk girth, one foot above the ground, of seven feet two inches, and a spread of branches of thirty-three feet—certainly not a very remarkable growth in forty-six years. There is a fine Cedar on the grounds of the old Prince Nursery, in Flushing, now some sixty-five feet high, with a trunk which measures, five feet from the ground, eight feet and two and a half inches, but the fact that this tree is so rarely seen in the Middle States still needs explanation.

The best accounts of the Cedar of Lebanon are found in the paper by Sir Joseph Hooker already referred to, and in the historical and cultural essay published by Monsieur Loiseleur-Deslongchamps in 1837, entitled "*Histoire du Cédre du Liban.*"

Foreign Correspondence.

London Letter.

WE are getting tired of double flowers, not long since the acme of perfection with horticulturists. The first tendency to doubleness in a flower was hailed with delight, and the monstrosity was coddled and encouraged till a perfect double flower was obtained. Thus came the double Dahlias, the Hollyhocks, and hosts of other things besides. The double Dahlias were discarded for the single-flowered kinds not very long ago, and most people asked how it came to pass that such monsters as the big Dahlia were tolerated. The revulsion now is against the double Camellias, which very few people admire. No lady will wear them; they are worthless for bouquets. In fact, they have had their day. But the single-flowered Camellias are in favor, and are likely to become very popular. The blossoms of *C. reticulata* are too large to be worn by any one save a cabman at a wedding, but they are grand flowers, nevertheless. The bicolored flowers of *C. Donckelaari* are also handsome. These are, however, large-flowered species. But we have now a race of Camellias, recently introduced from Japan, and being rapidly propagated by the nurserymen here, which are remarkable for their compact habit, small leaves, and small single or semi-double flowers of the most elegant form, and varying in color from white to deep crimson. Probably they are the result of crossing the small-flowered *C. Sasanqua* with the larger-flowered race, but, whatever their origin, they are certain to become popular garden-plants. I do not pretend to any knowledge of the horticultural methods of the Japanese save what I have seen in a few plants imported direct from Japan, but these show a lamentable want of neatness and true horticultural skill. These grafted Camellias are a case in point; nothing could be more primitive, nothing uglier than the manner in which they are grafted. No English horticulturist would tolerate such work. The Japanese distort, starve and mutilate their plants to get them into some ridiculous and unnatural shape; they cannot allow their plants to grow their own way. This may be art, but it is an abomination all the same. Judging of Japanese art in the garden from the papers lately published in Garden and Forest, I will say that we want none of that kind of garden-makers in England at any rate.

None save a Philistine would venture to find fault with double Roses; at the same time the single-flowered kinds are creeping into favor in many gardens in England. The Rose Conference and Exhibition to be held at Chiswick in July next is expected to bring to the front a great many Roses which at present are known only to a few specialists. This, of course, applies chiefly to species, for which a special appeal is made in the schedule. Many of these are of great beauty and as easy to manage as the Dog Rose, but they are rare in English gardens. Your Cherokee Rose flowered here for the first time, I believe, last year; and now many growers are wanting it. The handsome, large-flowered *R. involucrata*, said to be the most tropical of all Roses, was not in cultivation until it was introduced from India to Kew last year, where it flowered out-of-doors in autumn. The flowers are white, and very fragrant. Probably this species will prove hardy in the south of England. Seeds of the new *R. gigantea* have also been received at Kew, and the pretty little *R. minutifolia*, figured in Garden and Forest last year, is represented by young plants raised from seeds supplied by an Italian nurseryman. The seeds distributed by Vilmorin & Co. at a franc each all failed. The remarkable Afghan species, *R. simplicifolia*, is in vigorous health here, but it does not flower; on the other hand, the hybrid, *R. Hardyi*, raised from the last-named and *R. laxa*, flowers frequently. It is one of the most beautiful of all single Roses; it has large yellow petals, cup-like in arrangement, with a blotch of crimson in the base, suggestive of the Gum Cistus flowers. *R. simplicifolia* would probably do better with you than in England, as it does not like our damp, dull winters. Does any one know of the existence of the single *R. anemonæfolia*? We have the double red and double white, as introduced by Fortune, but the single-flowered form is not known here. As it is Japanese, some of your readers who introduce plants direct from Japan may know something about it. The single-flowered Banksian is almost as rare. The white and the yellow double-flowered varieties of this grand Rose are plentiful enough, but we did not know of the existence in gardens of the single-flowered form until it was found last year in the garden of Mr. Hanbury at Mentone. Our knowledge of Roses will no doubt be greatly improved by this forthcoming conference.

The death of Mr. J. T. Peacock, of Hammersmith, has robbed English horticulture of one of the most remarkable of its patrons. Many years ago Mr. Peacock was famed for his rich collection of succulent plants, a collection which in point of number of species was surpassed only by that at Kew. He paid very high prices for large specimens of Echinocactus, Cereus, etc., and whenever any of these arrived or flowered he threw his garden open to visitors. These large plants always perished in a short time after their arrival in England. Mr. Peacock's collection of succulents grew so large that he could afford to loan great numbers of them to the Crystal Palace, the Royal Horticultural Society and other large public gardens. Latterly he turned his attention to Orchids, and before his death he possessed one of the richest collections in the neighborhood of London. The whole collection of Orchids and succulents is to be sold by auction. It is remarkable that so many large private collections of Orchids are distributed by the auctioneer annually. Last year, within about three months, no less than six large collections of Orchids were sold by auction in London. This year already five large collections have been placed in the auctioneers' hands. Orchids are costly playthings, no doubt, and although some amateurs have occasion to regret ever having had anything to do with them, others are lucky and get most of their outlay back. There must be an enormous number of new growers to make a demand for all these plants; besides these, the importations which are ever on the increase. The last big arrival was three thousand fine plants of the new *Cypripedium Rothschildianum*, which were sold here on Thursday last. Those who bought and paid dearly for the few sold last year will have occasion to regret their purchases now. There is a good deal of lottery in the Orchid trade; much more than in any other branch of horticulture. There is a marked increase in the number of growers in France, Germany and Belgium, and I am told that in America Orchids are almost as popular as in England.

The directions given in Garden and Forest, on February 13th, for the management of green-house plants makes us here envious of the weather which enables you to syringe green-house plants twice a day in winter, and makes it necessary for you to use shading. Here we do not get sun enough for Ferns, even, and no one would think of using shading in February, or even in March, for any plant save filmy Ferns. The losses caused by the bad light, fogs and changeable weather here are often heart-breaking. English horticulturists would be glad to get some of that sunlight in February which is over-abundant with you. For early forcing your bright sunlight in winter must give you an immense advantage. For the last fortnight the weather here has been dull and snowy, with a cold north-east wind blowing, and scarcely any sunshine. Plants outside have been nipped by frost, or they have crept back into their winter shells. In-door plants are suffering from fire-heat and want of light. In the country matters are not quite so bad, and I speak only of what is experienced by horticulturists in the neighborhood of London.

Kew. *W. Watson.*

Cultural Department.

Asparagus for the Home Garden.

IN boyhood I was accustomed every spring to wander along "high-water mark" on the shore of the Chesapeake and gather the brittle stems of the wild Asparagus, which grows there in the greatest abundance. No knife was needed, for the stems snapped off at the lowest point where they were tender. All that was gathered was therefore eatable. This wild Asparagus was never as large as the highly-fed stems from the market gardens, but one who has become accustomed to its use will always take it in preference to the cultivated sorts. My early experience with this savory plant intensified my distaste of the first market asparagus I ate, which was white, and worthless as an article of food. Argenteuil Asparagus is celebrated as unsurpassed, and some authorities assert that Asparagus, to be good, must be bleached, but if the canned French Asparagus is a fair sample of the bleached product, it is only sophisticated palates which prefer the stringy white stalks to the tender green stems which have developed above ground.

To make an asparagus bed for home use there is no need to buy roots, which in many cases will come to you in a mouldy and worthless condition. Asparagus is a wonderfully hardy plant and will stand any amount of rough treatment, but nothing so quickly moulds in damp packing as the roots do, and many nurserymen will pack them with wet moss and in this way insure their destruction. In making an asparagus bed, remember that it is to last many years. It will therefore pay to prepare the soil very thoroughly. If your garden is of heavy clay it will pay you to use an abundant dressing of sand. If the

spot is wet thorough drainage is essential. Trenching twenty inches deep, with a thick coat of manure worked in, will pay. Get as good a strain of seed as you can, although I have grown as fine Asparagus from seed gathered from the wild plants as I have from any of the colossal sorts, and any "variety" you may get will be full of other varieties. Asparagus, being a dicecious plant, is hard to keep in strict strains. On one corner of the plot selected for your bed, or near by, prepare a small bed and sow the seed as early in spring as possible. As soon as the young plants are large enough to handle, say two or three inches high, and about the size of very fine knitting-needles, lay off your plot in rows two feet apart and dibble the plants in six inches apart. Keep them well cultivated all summer, and in the fall give a coat of rough manure all over. The next spring you can cut a little asparagus, and the roots being near the surface it will be very early. The next fall and spring thin out the plants in the row, leaving only every fourth one to grow. The second spring give the bed a dressing of Kainit (German potash salts) before growth begins, at about the rate of a ton an acre. Then, when the young growth appears, cut your tender green asparagus off at the surface of the ground, and pity the deluded people who consider the white woody underground portion of the stem eatable.

The subsequent culture will be a heavy fall dressing of manure and a dressing of Kainit once in three or four years. A one-year-old Asparagus plant raised in this way is larger by far than the two-year roots sold by nurserymen. I once planted a large bed in this way, and the following spring marketed good Asparagus from it, which could not have been done from two-year-old roots buried several inches under ground.

Crozet, Va. *W. F. Massey.*

Primroses.

The true Primrose is very rare in this country. The flowers generally grown and offered for sale in the flower-stores as Primroses are hybrids probably between the common Primrose (*Primula vulgaris*) and the Cowslip (*P. officinalis*), and possibly (*P. elatior*) the Oxlip; but the varieties and hybrids are so intercrossed that it is hard to trace their real origin. The flowers are borne on short pedicels springing from a common peduncle, and the whole may be termed an umbellate scape. In the true Primrose the scapes are uniflorous, all springing from the root-stock or crown, the individual flowers being much larger and of better form than in the hybrids.

The hybrid Primroses, as well as Polyanthuses, are easily raised from seed sown in a cool green-house in March or in frames in April. When large enough to be handled they are transplanted into boxes and kept in a shady place until they are large enough to plant into nursery-beds. We plant them in beds surrounded by stout boarding or planking, which are known as "cradles," over which we can lay lattice-work, or other light shading, during the hottest weather. In color the flowers vary from almost white, through yellow to nearly crimson. In some of the varieties a short, common peduncle, with long pedicels, gives the plant the appearance of the common Primrose. These hybrids are largely grown for spring bedding, especially in England. Owing to the practice of transplanting in spring for immediate effect they are not so satisfactory here as we could wish. Root-action is disturbed, and vitality consequently reduced, so that the first few bright days in May causes them to wilt so much that they begin to look "seedy" before they really arrive at their best. Much

The Cedars at Wilton House.—See page 147

better results are obtained by letting them bloom where planted from seedling-boxes, especially if they are so arranged as to have the protection of a few sashes from the middle of March onwards.

The true Primrose does not mature seed very freely, but it is easily increased by division. It is not easy to keep it, however, during the hottest months. A cool soil and shade during the brightest part of the day are necessary to success.

When fall comes we plant our Primroses along with the Violets, and get abundance of bloom during the winter. Primroses make up very nicely in bouquets of twenty-five to thirty flowers, with a few of their own leaves.

Alpine Auriculas can be grown from seed and treated in the same way as recommended for the hybrids. They can be used for bedding in the same way. They do not ripen seed, but continue blooming, though sparingly, throughout the summer.

Wellesley, Mass. *T. D. Hatfield.*

Orchid Notes.

Dendrobium Farmerii is a lovely Orchid, especially adapted for basket-culture, belonging to the evergreen section of the genus, with quadrangular stems, about a foot high, producing near the top pendulous racemes or bunches of straw-colored flowers, delicately tinged with pink, and having a rich golden lip. It is a native of the Khasya Hills, and is easily grown, requiring a warm house during active growth, after which it may be placed in a cool-house and kept fairly dry. There are two rare and choice varieties of this species—one with golden-yellow flowers, while in the other they are pure white.

Dendrobium splendidissimum is the best of a series of hybrids resulting from the crossing of *D. nobile* and *D. aureum*. It is a grand Orchid, combining the best qualities of both parents, and retaining the Primrose fragrance of *D. aureum*. The flowers are nearly four inches across, white, suffused with rosy-purple, the lip having a large blotch of deep purple, surrounded with a zone of creamy-white. This plant should have a long rest in a cool-house in order to flower properly.

Dendrobium primulinum is a fragrant Orchid, deciduous, producing pendulous bulbs about one foot long, from the sides of which come solitary, pale mauve flowers, with large spreading lips, which are white, tipped with rose. The variety Giganteum has much longer and very slender stems. The flowers are much larger, with a very much developed lip, often two inches across, pure white, and veined with purple. It was introduced in 1857 from Nepaul. It requires the same treatment as *D. primulinum*, and should be grown in a basket or on a block.

Phalænopsis Veitchii.—This rare species, now in flower with us, is presumed to be a natural hybrid between *P. rosea* and *P. Schilleriana*. The habit of the plant is like that of *P. Schilleriana*, but is not nearly so robust. The scape is that of *P. rosea*, and bears about a dozen pretty pinkish flowers, which in shape and markings strongly indicate the parentage. The two plants we have are, I believe, the only ones that have yet been found. The pale variety, Brachyodon, is much more attractive than the type. In it the flowers are somewhat larger, and the plant more robust. This variety is represented by a unique specimen.

P. Stuartiana is a somewhat recent addition to this lovely genus, and proves to be a great acquisition. It is now pretty plentiful, very easily grown and an abundant bloomer. It may best be described by calling it a white *P. Schilleriana*, though in many respects it is abundantly distinct from it. There is a great variation in the foliage. In some plants the leaves are deep green, with only the faintest marbling, while others can scarcely be distinguished from *P. Schilleriana*. The flowers are usually cream-colored or pure white, the inferior halves of the lateral sepals yellowish, copiously spotted with dark cinnamon. Sometimes the whole flower is speckled with purple, as in *P. punctatissima*. The flowers are very closely set on the raceme, which is usually much branched, even on small plants. This species is interesting for its propensity to form root-buds, which quickly develop into flowering plants. It requires the usual Phalænopsis treatment, and now is a good time to overhaul the plants and remove the old decayed moss and roots, replacing them with new compost of fibrous peat and clean sphagnum. Baskets or cylinders of wood or clay will be found most suitable for this class of plants.

Odontoglossum niveum is a slender, low-growing Orchid, with ovoid, compressed bulbs, and linear, lanceolate leaves about one foot long. The slender racemes bear about a dozen very pretty flowers, about three inches across, white, waxy, copiously spotted with reddish-purple. The narrow segments are reflexed at the points, and the lip is beautifully ornamented with a golden crest. This species was introduced nearly half a century since from Pamplona, where it was found at an elevation of 6,000 to 8,000 feet, and until recently was very rare. A fine plant is in bloom with us, and grows freely with the other Odontoglossums. *F. Goldring.*

Kenwood, N. Y.

Galanthus Elwesii.—Last fall we planted several hundred bulbs of this pretty Snowdrop in a cold-frame. As the result, probably, of the abnormal mildness of the winter season, the first week in February found all of them in full bloom, and they are still in good condition, although the soil is frozen solid. The sashes serve to keep off snow and rain, enabling them to maintain their snow-white purity. *G. Elwesii* is quite distinct from *G. nivalis* and its varieties, the petals being distended and narrowed at the base, the inner perianth-segments smaller, and constricted above their middle. Planted with *Chionodoxa Luciliæ*, this Snowdrop makes a pleasing sight in the early spring months. Both are perfectly hardy.

Ornamental Grasses.—The Eulalias, especially *E. Japonica* and its varieties, Zebrina and Variegata, are well known as ornamental plants, and deservedly so. The *Eulalia gracillima univittata*, however, is not as widely known as it should be. It is dwarfer than those named above, and is of a graceful habit, its distinctive feature being a pure white mid-rib running through each leaf. Last year this plant fully established its value and reliability as a decorative plant.

Scirpus Tabermontani zebrina, or Porcupine-grass, as it is sometimes called, is well worth growing, too. Being of doubtful hardiness, for assured safety it should be wintered in a cool green-house. When first introduced into cultivation it was grown as a warm green-house plant, but has since proved nearly hardy. Any little trouble taken with it will be amply rewarded by its tufts of leaves, two to three feet long, resembling bunches of porcupine-quills, except in color, which in the grass is green and white in alternate bands. The younger leaves are suffused with rose. Another species, equally pretty, is *S. Holoschænus variegatus*, a grass with leaves banded in the same way. This is quite hardy, and grows a foot high. These grasses do best in soils that are moist and rich.

Astilbe Japonica aureo reticulata.—This is a more valuable plant, if possible, than the species, being quite as useful for flowers, while the leaves are veined with rich yellow. The leaf-stalks, too, are noticeable for their crimson hue, giving the plant a distinct and attractive appearance when grown as a pot-plant. This variety is of strong constitution, and promises to become popular. *E. O. Orpet.*

Passaic, N. J.

Plant Notes.

Berberis Lycium.*

When this Barberry comes to be better known—and a figure which has been prepared for the *Botanical Magazine* will do much, when published, to further a knowledge of and create an interest in the plant—it will surely become a favorite. Hitherto, I believe, there has been no figure of *B. Lycium* published, and I do not find any record of the plant being cultivated. It has been growing at Kew for several years under the name of *B. elegans*, and this name occurs in the lists of several continental botanical gardens. No one hitherto appears, however, to have identified the species under its garden name with the wild type, which occurs in sunny places and elevations fron 3,000 to 9,000 feet above sea-level in the western Himalaya, from Garwhal to Hazara. In the Kew collection are individuals which are undoubtedly referable to *B. Lycium*, and, indeed, identical with it, *i. e.*, they cannot be separated even as varieties from a nurseryman's standpoint—*B. glaucescens*, *B. arihuacensis*, *B. aristata* (under the latter name widely different plants—belonging, perhaps, to three distinct species—are cultivated in English gardens).

B. Lycium, as far as Kew experience allows me to judge, seems as hardy as our native *B. vulgaris* or the North American *B. Canadensis*, and produces its wealth of golden racemes after all the allies of *B. vulgaris* and the very numerous forms of that species have passed out of flower. On the other hand, however, it appears not to blossom in a young state, but cedes to none in beauty and floriferousness when once the bush has reached the flowering stage.

It forms an erect bush about a couple of yards in height, with whitish bark and subsessile, subpersistent, lanceolate or narrow, obovate leaves, of a light greyish-green above and very glaucous beneath. As a rule the leaves are entire, but

* Berberis Lycium, Royle, *Botany of the Himalayan Mountains*, 64; *Transactions of the Linnean Society of London*, xvii., 94.

on strong, vigorous shoots they are not infrequently furnished with two or three spiny teeth. The drooping raceme is longer than the leaves, is either simple or compound, and is often corymbose; the berries are elongated in form, violet in color, and are furnished with a conspicuous style and capitate stigma.

In the districts where it is found wild, Royle says *B. Lycium* is largely used in the manufacture of *rusot*. The following lines respecting *rusot* are copied from Royle: "The wood and bark of the Himalayan species of Barberry are not only used simply in India, but an extract is prepared from them which is to be found in every bazaar, and described in all the works on materia medica. This is prepared by digesting in water sliced pieces of the root, stem and branches of any of the species of Barberry in an iron vessel, boiling for some time, straining and then evaporating to a proper consistence. This extract is much employed in Indian medicine, and everywhere known by the name of *rusot*." *George Nicholson.*

Royal Gardens, Kew.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XIII.—SOME OF THE CONDITIONS WHICH FAVOR RAPID GROWTH—CERTAIN PHYSICAL PHENOMENA OF GROWTH.

THE MEASUREMENT OF GROWTH is by no means so easy a matter as would appear at first to a casual observer. In the case of strong shoots, which increase in length very rapidly, it is, of course, sufficient merely to make measurements with any accurate scale, at proper intervals. For instance, shoots of Bamboo can grow at the rate of six inches to one foot in twenty-four hours, and such rapid growth can be very readily measured. But when we are dealing with plants which grow slowly, or when we desire to note the amount of growth during short periods of time, it is necessary to make use of apparatus by which all growth can be registered, and the exact times of growth known. In general, such pieces of apparatus consist of a drum made to revolve regularly, by means of clock-work, and bearing smoked paper, which can be marked by an index connected with the growing part of the plant under observation. When such an apparatus is properly adjusted it can run along for many days, making an accurate record of all the varying rates of growth, and the times of these variations can, of course, be easily compared with the rates. It has been urged that, in the case of such experiments, the plants are withdrawn from their natural conditions and subjected to special conditions in the laboratory which may disturb in many ways their natural activities; and hence, it is said, it is not right to conclude from these experiments that the growth registered by the apparatus is the same which the plant would have made in the open air or in its natural home. Such objections are not well founded. Nevertheless, they must, in some instances, be taken into account, and, further, it must be remembered, in examining the general conclusions drawn from the results of experiments of this character, that different plants, under precisely the same conditions, may behave very differently. In fact, there are a good many peculiarities or idiosyncrasies of plants which are as yet wholly unaccounted for. But the general statements which now follow are based on an examination of a large number of plants, and doubtless apply, with very few exceptions, to all of the common plants which fall within the province of the horticulturist and the forester.

RELATIONS OF GROWTH TO TEMPERATURE.—There appears to be a certain degree of temperature which is suited to the most rapid growth of every plant. Growth can take place at temperatures far above this, and can continue at temperatures far below it, but at *the optimum* the multiplication and the enlargement of cells proceeds most rapidly and uninterruptedly. The degrees which have been made out for some of our common plants are given in the following table:

	Minimum.	Maximum.	Optimum.
Wheat, ...	41° F.	108° F.	84° F.
Cress, ...	34° F.	98° F.	80° F.
Red Clover, . .	42° F.	82° F.	70° F.
Indian Corn, . .	48° F.	115° F.	90° F.

These figures are fair averages of those given by observers.

RELATIONS OF GROWTH TO LIGHT.—In general it must be admitted that cell-growth is retarded by light. At first this seems very strange when we reflect that it is through the agency of light that the green parts of plants construct all their building materials. The putting of these materials in place is, however, quite a different matter. It can go on in the light, but it proceeds, as a rule, faster in the dark. A moment's consideration will show that all growth of ordinary roots takes place in the dark, and the thickening layers of stems are completely shielded from the light; moreover, the unfolding of buds at the covered growing points of stems and branches is another case in point. To the cultivator of plants the fact is familiar that in a dim light the seedlings are apt to be "*drawn*," whereas in bright light they are more "stocky," and are better able to resist attacks of disease. The growth is less rapid in the latter than in the former case. Hence we must bear in mind the fact that rapid growth is not by any means necessarily that rate which is best for the plant under cultivation.

RELATIONS OF GROWTH TO THE MINERAL MATTERS IN THE SOIL.—This subject is one of surpassing importance, since it underlies all success in cultivation. The experiments in this field of observation have been conducted not only in special soils prepared for the purpose, but also by a method capable of yielding even more satisfactory and exact results—namely, by what is known as "water-culture." When seedlings have thrust out one or two strong roots, and a few leaves, they are placed above the surface of the solution which is to be employed in the experiment, and the roots are permitted to dip into the liquid. For instance, one plant will be grown with pure water, another with water containing one of the salts of potash, another with another salt of the same base, and so on. It is plain that such observations can be indefinitely extended to all classes of substances.

From the myriads of results which have been obtained by this mode of experimenting, the following general conclusions appear at the present time to be justified:

Growth and the preparation of materials for growth are checked when the substances mentioned below are absent, or are present in too small amount—combinations of potassium, magnesium, calcium, nitrogen, iron, phosphorus. These, together with sulphur in very small amount, and for some plants, sodium and chlorine, may be regarded as absolutely indispensable. Acting on the hints afforded by water-culture, it is possible to provide for a certain species of plant the precise amount of the substances best adapted to the needs of its growth. In practice, however, there are several serious difficulties which stand in the way of transferring these results from the laboratory to the garden or the forest. The most perplexing hindrance is that as soon as a solution of these mineral matters comes in contact with the soil it is liable to undergo changes in composition. Some kinds of soil, notably clayey soils, have the extraordinary power of withdrawing from solutions certain of the matters held in solution, and in this mechanical adhesion, as it is called, the abstracted substances are liable to be acted on by the air which is entangled in the soil. Although the plants may get at these matters after a time, and perhaps in the very best form in which they can use them, we are not sure that what we place on the soil is what the plants are going to get. For exact information in regard to this most important matter the reader may consult some authoritative work like that which is mentioned at the end of this paper.*

PHYSICAL PHENOMENA OF GROWTH.—The pressure which is exerted by a growing part is in some cases, capable of measurement. The results of such measurements are surprising. Only a few examples can be cited here; other cases may be found in the treatises referred to in earlier papers of this series.

Darwin found that the tiny underground stemlet of a germinating bean was able to move a weight of rather more than three pounds, and in another instance about eight pounds.

In the case of the fruit of a squash placed in a frame-work connected with a lever, a force of more than two tons was exerted by the multiplying and enlarging cells.

When trees grow on ledges the increase in the thickness of the large roots at their very base will frequently raise the whole trunk for a distance of an inch or more, the firm ledge under it affording an unyielding support, against which the pressure of the cells of the thickening roots comes. This fact should be borne in mind in the examination of those cases of supposed growth in height of old thick stems which may have served as gate-posts. By the raising of the end of the gate above its former level the old stem, which we know is incapable of growth in length, may *appear* to have grown, whereas it was simply being lifted by the roots underneath.†

Cases in which growing roots have torn asunder stone foundations, into the crevices of which they have insinuated themselves, are doubtless familiar to all the readers of this paper. The force exerted in all these instances has been exercised solely by the innumerable delicate, thin-walled cells, which increase in number and in size in the orderly manner we have attempted to describe.

Cambridge, Mass. *George Lincoln Goodale.*

*Storer's AGRICULTURE.

†See also GARDEN AND FOREST, March 6, page 109.

Correspondence.

To the Editor of Garden and Forest:

I have about two acres which I want to put into a grove of Nut-trees, such as Chestnut, Hickory, etc., and would like to know the best size to get the trees and the right distance apart to plant them. Of course, I shall thin them out to some extent as they grow up, but do not want to do this until those taken out will be of some service.

New York. *C. D. Miller.*

[It is more economical to plant the nuts of Hickories, Walnuts and Chestnuts where the trees are to grow than to transplant seedlings. The nuts should be procured in the autumn and kept over winter in moist sand, as if they are allowed to become dry they lose their power of germination. They should be planted as soon as the frost is out of the ground in the spring. If the ground is hilly or filled with rocks the nuts must be planted, two to six feet apart, wherever sufficient soil can be found for them, by making a hole with a stick from a half to one inch deep, dropping in the seed, and then closing the hole by pressing the foot upon it. This, too, is the best method for planting where the ground is so impoverished that it will not produce a heavy crop of grass or weeds. But when the ground is rich and level it should be ploughed and marked out as though it were intended for a crop of corn; the nuts should be planted four feet apart, and the soil should be cultivated to destroy the weeds until the seedlings are large enough to shade the surface, after which no further cultivation will be needed.

Seedling Chestnut plants, one to two feet high, can easily be transplanted and can be procured from nurseries. So can seedling Black Walnuts, although little is gained by planting seedlings rather than seeds of trees which, like the Black Walnut, the Hickories and the Oaks, make strong tap-roots. Seedling Hickories are not kept in any large quantity in American nurseries.—Ed.]

To the Editor of Garden and Forest:

Sir.—In the notice of the Double-flowered Horse-chestnut, by George Nicholson, of Kew, published in No. 51 of Garden and Forest, I find it stated that the flowers became double by the changing of the stamens into petals.

In a double-flowered Horse-chestnut which I examined last summer, the discoid base of the flower was converted into a pillar, from which arose four distinct flowers in succession, each furnished with its complement of stamens and petals. There was, at the same time, a spiral movement which had disposed the petals of the different flowers in such a manner as to produce a many-petaled rosette, but each flower of the series retained its own stamens unchanged.

I intend, hereafter, to endeavor to observe whether plants belonging to the *Discifloræ* differ in their method of doubling from plants belonging to the *Calycifloræ*.

Media, Penn. *G. A. Lewis.*

To the Editor of Garden and Forest:

Sir.—Your remarks upon the vandalism of cutting down and peddling out the remains of the old historic Oak at Woodbridge, Connecticut, remind me of an incident of my own experience which has never been recorded, but is worthy of mention as an illustration of a degree of barbarism which it seems incredible can still exist.

During the late civil war there was, at one time, a great demand for "Pasture Oaks"—as the White Oaks growing singly in open fields were called—the timber of which commanded a high price at the Navy Yards.

Near where I then lived in Massachusetts was a farm which had been in the family of the man who then occupied it, for more than 200 years, the house in which he lived being more than 150 years old. It stood, perhaps, ten rods back from the high-way, and on each side of the entrance to the lane which led up to the house was a magnificent White Oak, which must have witnessed the course of life from infancy to the grave of many generations of the ancestry of the man who then owned and tilled the farm. I passed them almost daily, and they were to me a constant source of admiration, both on account of their intrinsic grandeur, and the reflections excited by the thought of the stories they could tell.

You can better imagine than I can describe my sensations when, on approaching the place one day, I saw one of them prostrate, and the owner with his assistant busy in cutting down the other, and the only reply he made to the exclamation that rose involuntarily to my lips was that he "guessed there would never be much more timber in 'em, and he never again could get so good a price for it."

Minneapolis, February 20th. *H. W. S. C.*

To the Editor of Garden and Forest:

Sir.—It having come to my knowledge that a florist of this place, David Cliffe, was suffering from poison supposed to have been caused by some plant, I was led by what has appeared in Garden and Forest to suspect that perhaps *Primula obconica* might be that plant. I wrote him of my suspicion and this is what he replies:

"I am positive that *Primula obconica* is poisonous to some persons. As you know, I was under treatment for poison which I received from Poinsettia, through cuts in my hand. Feeling much better, I busied myself potting my Primulas. In the evening I was completely blind from my face being swollen. It remained in this condition for a day. Since this my foreman, after packing up some of the plants, had his hands and arms poisoned. Last week a customer who had taken some of the plants refused to take any more, saying some who had handled them were poisoned by them."

It is hard to believe this of any Primula; and probably the cases in which it poisons are very few, as there is no doubt that hundreds handle it with no ill effects, just as is the case with many other plants. Personally, I am compelled to avoid any contact with the common Poison Ivy; and even the seeds of the Oregon Maple (*Acer macrophyllum*) and of the *Ostrya Virginica*, both of which are covered with minute hairs, and excite an itching and inflammation of my hands, while many others who have handled them are not at all affected. The *Primula obconica* is such a beautiful and useful plant that it will be much regretted if it should be proved to be really poisonous to many persons.

Germantown, Phila. *Joseph Meehan.*

To the Editor of Garden and Forest:

Sir.—Permit me to express my satisfaction with your editorial article on the "Soil and National Development," in your issue of February 13th. It is true, as you say, that all wealth is drawn from the earth itself, and it is equally true that the rocks and minerals, and especially the soil which is produced from them, are useful to man just in proportion to his knowledge of them and their properties. It will be fortunate for our people if you can arrest their attention, and show them in what ways the soil is being ruined in large regions of our country, and by what methods its fertility may be preserved as an inheritance for future generations.

The richness of the virgin soil is made up of the savings of past generations of plants, very much as the riches of a nation are made up of the small savings of past generations of men. If we continue to return to the soil a fair equivalent, in energy and mineral, for that which we remove in the crop, the soil will grow richer; but if we continue to remove the crop without such equivalent, if we steadily plunder and rob the soil, it will finally be reduced to the state of barrenness and savagery from which it has been raised by the vegetation of past ages.

Mahoning, Ohio. *J. W. Pike.*

Recent Publications.

Die Landschaftsgaertnerei; ein Handbuch fuer Gaerter, Architekten und Freunde der Gaertner-kunst. Von E. Petzold, Leipzig, Haessel.

The first edition of this work on landscape-gardening was published in 1862, and won high praise in Germany despite the fact that the author was said to have followed the English artist Repton with too confiding a faith. After twenty-five years of study and experience, during many of which Herr Petzold has held the position of Park and Garden Director to Prince Frederick of the Netherlands, he now reissues his book in an augmented and much-improved form. The subject is discussed in the thorough German way, and among the most interesting chapters may be named those which treat of "The Colors of Trees and Shrubs with reference to Foliage, Flowers and Fruit," "The Characteristics of Tree-forms as affecting the Lines of Landscapes," and "The Arrangement and Care of Cemeteries." Form, color and linear and atmospheric perspective, are discussed with reference to the landscape-gardener's problems; all the elements which enter into

his work are separately examined; the characteristics of the old and new styles in gardening are explained; and, in short, nothing theoretical or practical is omitted which could serve to make a useful hand-book for artists and amateurs. Some of the illustrations are from designs by Friedrich Preller, a landscape painter and professor at the Art Academy of Dresden.

The Rose Garden. By William Paul, F.L.S., etc., London: Kent & Co. Ninth edition.

The fact that this book has within a comparatively few years passed through nine editions establishes its value among the many manuals of its kind which have appeared in England. Of course its second division, which gives careful directions for the cultivation of many kinds of Roses, is less useful in this country than in England. But in the first division is contained an essay on the history and poetry of the Rose, which is delightful reading; the origin of many favorable varieties is explained in an interesting way; and an appendix contains two valuable articles on the botany and the entomology of the Rose. A full bibliography of works on the Rose published during the past ninety years adds to the merits of a very attractive work.

Periodical Literature.

Now that a project is on foot, under the auspices of the Torrey Botanical Club, to establish a botanical garden in this city, it is interesting to recall the fact that such a garden long ago existed here.

An article recently published in the *American Druggist* quotes as follows from the *American Medical and Philosophical Register* of July, 1811:

"This institution, the first of the kind established in the United States, is situated about three and a half miles from this city, on the middle road between Bloomingdale and Kingsbridge. The ground, consisting of about twenty acres, was originally purchased of the corporation in this city, in 1801, by Dr. David Hosack, the founder of the establishment. The view from the most elevated part is variegated and extensive, and the soil itself of that diversified nature as to be particularly adapted to the cultivation of a great variety of vegetable productions.

"Immediately after the purchase, the proprietor, at a very considerable expense, had the grounds cleared and put in a state of cultivation, arranged in a manner the best adapted to the different kinds of vegetables, and planted agreeably to the most approved style of ornamental gardening. A conservatory for the preservation of the more hardy green-house plants was also built.

"As the primary object of attention in this establishment was to collect and cultivate the native plants of this country, especially such as possess medicinal properties, or are otherwise useful, among others, such gardeners as were practically acquainted with our indigenous productions were employed to procure them, and by the distinguished liberality of several scientific gentlemen in this country there were in cultivation at the commencement of 1805 nearly 1,500 species of American plants, besides a considerable number of rare and valuable exotics.

"In the year 1806 very important additions were made to the collection of plants, from various parts of Europe, as well as from the East and West Indies. A second building for their preservation was also erected, and the foundation of a third laid, which was completed in the following year. In the autumn of the same year, 1806, a catalogue of the plants, both native and exotic, which had been already collected, and which amounted to nearly 2,000, was published. Since that time the botanic garden has been greatly improved. The buildings, which are erected on the most recent plan adopted in institutions of this kind, consist of three large and well-constructed houses, exhibiting a front of 180 feet. The greater part of the ground is brought in a state of the highest cultivation, and divided into various compartments, calculated for the instruction of the student of botany and medicine, and made subservient to agriculture and the arts. The whole establishment is surrounded by a belt of forest trees and shrubs, and these are again inclosed by a stone wall two and a half feet in thickness and seven feet high."

In the year 1810 the legislature purchased the garden from its owner and put it in the care of the Regents of the University, who in their turn confided it to the College of Physicians and Surgeons of New York. It was not many years, however, before the ground it occupied became so valuable that the garden was "rooted up." Many of the plants were sent to the Bloomingdale Insane Asylum. In 1835 the twenty acres were valued at $100,000. Their value to-day it would be almost impossible to compute. In 1876, adds the *American Druggist*, a scheme for a botanical garden was started in this city, certain persons asking the legislature for a charter which would permit them to establish it in the neighborhood of the Natural History Museum. But as their action was prompted simply by a desire to prevent the Park menagerie from being removed to this locality, no more was heard of the garden when it was decided that the menagerie should remain at the Arsenal. The project of to-day has been born under very different conditions, and we may hope it will have a very different outcome.

The February number of the *English Illustrated Magazine* contains an interesting article, by Mr. H. Barton Baker, on "Cognac," the town and castle, not far from Angoulême, which, from a mediæval stronghold, were transformed years ago into a manufactory of brandy. The castle still stands almost intact, but is used as a warehouse for brandy-casks, and the quaint streets of the city everywhere reveal the presence of the dominant industry. Even the house-fronts, formerly of pure white stone, have assumed a piebald look in consequence of the fumes from the warehouses. The account of the processes of making and keeping the spirit which the author gives are most entertaining. "But," he says, "brandy is rapidly becoming a thing of the past, thanks to the ravages of the phylloxera. Only eleven years ago the Cognac district had about 60,000 acres planted with vines; of these nearly 8,000 have been utterly destroyed, and over 20,000 seriously injured; since then three-fourths of the area have been desolated and the remainder much affected, and the opinion of the leading merchants is that the chances are that in another generation the true *eau-de-vie* will be a liquor *introuvable*. Some attempt is being made at replanting the vineyards, though, in most cases, the pest reappears upon the young shoots, and here and there experiments are being made with American vines, which are said to be phylloxera proof, but the prospects of Cognac can scarcely be said to be improving to any great extent."

This state of things has brought about a painful decrease in the activity of the town, especially as regards the immense establishment organized in an ancient convent which is owned by the Messrs. Hennessy. "But while an utter stagnation of business prevails among the large houses, some of the smaller ones are driving a brisk trade—not, however, with the production of the grape. From Holland and Germeny large consignments of spirit obtained from grain, potatoes, beet, or any refuse from which alcohol can be distilled, are sent into Cognac. This new fiery liquor is doctored, watered, flavored, colored, put into bottles or casks, branded 'cognac,' and is received as such all over the world. This is the stuff the English publican vends, sometimes pouring it out of old bottles bearing a well-known label to deceive his customers. In fine, it is this decoction that is generally drunk in this country and Germany and in all parts of France as well, especially in the Parisian cafés, under the name of cognac. Those who drink pure brandy nowadays have to pay very dearly for the article."

The best brandy now costs at least twenty-five English shillings a bottle, and is said to be almost all consumed in the United States.

According to the *Pharmaceutical Record*, the source of the opium supply of the United States is central Asia Minor. Here the Opium Poppy (*Papaver somniferum*) is "easily cultivated on the plains or lower ranges of hills, a good rich soil being necessary, and considerable labor expended in caring for the plant during the season of growth. Seed is planted during the months of November to March, inclusive, in order to protect against possible accidents by storm, and also to secure a succession of ripening plants. When the plant has flowered the leaves that fall are collected (used as wrapping and packing in part), and when the capsule has attained its growth, the collectors begin their work in the afternoons by incising the capsules with an instrument formed like three knife-blades, which are separated from each other by a film of cotton twine and all bound as one; the operator takes the capsule in the left hand and with the right rapidly passes the blades around it in a spiral upward. In the morning the exuded milky juice, which, by exposure to light and air, has become of a brownish-red color, is scraped off, and the collected juice placed on a poppy leaf to partially dry in the sun. The opium as it dries is made into suitable balls and wrapped with poppy leaves, and packed in dried leaves to prevent the adhesion of the lumps into a mass. Beyond this simple process there appears to be no further manipulation of the drug, except where dishonesty is practiced, as the addition of various adulterants.

Notes.

Two new parts of Baillon's indispensable "*Dictionnaire de Botanique*," being Fascicles xxii. and xxiii., have reached us. The work is now brought down to "Leth."

Miss Emily L. Gregory's studies upon the "Development of Cork Wings on Certain Trees" is now reprinted in pamphlet form from the pages of the *Botanical Gazette*.

Last winter a Philadelphia gardener placed a frame over a spring in which Water-cress grew. The warmth of the water prevented freezing, and he had Water-cress all the winter.

Mr. Frederick Janson Hanbury, F.L.S., proposes to publish, by subscription, an illustrated monograph of British Hieracia. It will be issued in quarterly parts at six shillings for the colored, and at four shillings for the uncolored edition; and five years, it is estimated, will be required to complete the publication. Mr. Hanbury's address is 69, The Common, Upper Clapton, London.

Sixteen plans were recently presented in competition for the commission to lay out a new public park in Utrecht, Holland; but although two were rewarded with second prizes none was thought worthy of the first prize. Had as many plans been prepared for a work of this description in America it is certain that the most careful and exacting judges in the world would have been amply satisfied with some of them.

The Philadelphia Select Council, on March 7th, passed an ordinance appropriating Bartram's Garden and two other pieces of ground for park purposes, and providing for their purchase. Some other small parks have been given to the city, and additional ground will probably be bought by the city to increase the number and area of its open spaces. The movement for this object is most judicious and important.

The National Horticultural Society of France offers a prize of 2,500 francs, to be paid at the end of the present year, for the best practical work upon vegetable and fruit gardening and floriculture published since April 6th, 1886. It is offered in the name of the late Dr. Joubert de l'Hiberderie, who left the sum of 60,000 francs to the Society for the purpose of establishing this prize. Presumably the work must be written in French.

The Monograph of North American *Umbelliferæ*, upon which Messrs. Coulter & Rose have been constantly engaged for a number of years and which has appeared in the *Botanical Gazette*, is now issued separately in a handsome pamphlet of 144 pages with ten plates of 159 figures of cross-sections of the seed of the different genera, of which there are fifty-two indigenous to the continent north of Mexico with 217 indigenous species.

The annual banquet of the Philadelphia Florists' Club, was held last Thursday evening, and the guests from Boston, New York and other cities had renewed occasion to observe that the florists of Philadelphia excel in hospitality and good-fellowship, as they do in intelligence, taste and skill. A unique feature of the occasion was the toasting of several of the newer Roses, and the responses by the growers who had been specially interested in the dissemination of these varieties were instructive as well as entertaining.

Dr. C. C. Parry has recently printed in the proceedings of the Davenport Academy of Natural Sciences an account of the genus Ceanothus, with an enumerated list, and notes and descriptions of several Pacific coast species, based upon his forty years' observation of these plants in their native habitats. Dr. Parry distinguishes for the first time the following: *C. intricatus*, known only on the summit of Mt. Tamalpais, near San Francisco; *C. Andersoni*, from the Santa Cruz Mountains, *C. Californicus* and *C. divergens* from Napa Valley. With the two species of eastern America, thirty-three species are included in this, the latest revision of this difficult genus.

Professor Eaton, who lectured recently on Oaks at New Haven, said that the largest and most famous Oak that had been known in the State of Connecticut was the Charter-oak, on the Stewart estate in Hartford. "Two hundred and one years ago it was a large and ancient tree. The historical connections which have made it famous are well known. On August 20th, 1856, a great storm swept over this part of New England, and the aged tree was blown down. It was then 700 or 800 years old. The event caused much excitement. A dirge was played by the army band, and the bells were tolled at sunset. It was thirty-three feet in circumference and thirty-seven men could stand in its cavity at one time." This Oak was a White Oak (*Quercus alba*), while the tree recently cut down by vandal hands at Woodbridge, Connecticut, was a Black Oak (*Q. tinctoria*).

The *Cercle Floral*, of Antwerp, proposes to hold next year an exhibition illustrative of "Botany in its Geographical, Commercial and Industrial Aspects"—that is to say, not only the floras of different countries will be illustrated, but also, as fully as possible, the various products derived from them. Of course, collections with a similar aim have already been formed in various places, notably at Kew. But in this temporary exhibition it is proposed to bring the living and the manufactured products more closely together than is possible in permanent museums. The results of the skill of the hybridizer will also be systematically shown. Great botanical collectors will be honored by having as many as possible of the plants which they severally introduced grouped together and appropriately labeled. Those plants will also be gathered together which are most useful from an artistic point of view, as furnishing decorators and artisans with graceful suggestions. A congress will be held for the discussion of the various questions which such an exhibition will naturally bring up, and if the wide-reaching programme is carried out with any degree of success, Antwerp ought to be very attractive to students and lovers of plants during the summer of 1890.

It is usual, says the *Illustrirte Garten Zeitung*, of Vienna, to believe that the prices paid for Tulips in Holland during the celebrated "Tulip mania" have never since been equaled. The fact that they have been rivaled in recent times has not excited much attention because no single class of plants has been so conspicuously preferred as was the Tulip in its day. For example, a sum equaling $2,250 was paid by a nurseryman in Erfurt, Germany, for the original plant of *Magnolia Lenné*; in 1876, Mr. Francis Parkman, the historian, sold a hybrid Lily (*Lilium Parkmanni*) which had been produced on his estate near Boston to an English nurseryman for $1,200; and about a year ago Monsieur Lemoine, of Nancy, France, gave $200 for a bulb with two or three bulblets of the first semi-double Gadiolus. The prices given in this country for the Bennett and the Puritan Roses at the time of their introduction, and more recently for the Mrs. Alpheus Hardy Chrysanthemum, are familiar to all, but in these instances, of course, a large amount of stock was sold, while the sums paid by old Dutch amateurs were for single bulbs. Orchids bring higher prices to-day than any other plants. The Messrs. Veitch paid $1,800 for a *Cypripedium Stonei platytænium*, a plant more curious than beautiful, which consisted of but a single flower-stalk, at the base of which were three young shoots about one and a half inches in length; the same firm, on another occasion, gave $1,400 for two plants of *Cattleya Trianæ* var. *Leeana*, and a list of similar prices might be greatly extended.

A correspondent of an English journal, replying to a query whether there is such a thing as a plant that moves spontaneously, replies that *Desmodium gyrans* must be the plant referred to. It belongs to the Pea family and is a native of the East Indies, "where it rejoices in the name of Burram Chandali. It is a somewhat slender plant, seldom exceeding two feet in height; the leaves are not large, but trifoliate, the two leaflets at the base being much the smallest, and these comprise that portion of the plant which appears to be continually on the move, but the movement is very irregular, although rapid. The texture of the plant is somewhat thin, the color of the leaves being a bluish green, and the constitution appears somewhat delicate. I believe it to be a biennial, but have found it difficult to keep the plant alive during the winter months. Seeds can be obtained from the principal seedsmen. . . . The plants become characteristic as soon as the first leaves next the seed-leaves are formed, and the eccentric moving powers are developed. It does not like cutting, and the best plan to produce a bushy plant is from time to time to pinch out the extreme point of the shoot. It enjoys strong heat and a moist atmosphere. It is one of the most extraordinary plants in the vegetable world, but it does not possess any beauty." In Nicholson's *Dictionary of Gardening* 'Moving-plant' and 'Telegraph-plant' are given as the popular names of this Desmodium, and it is said that the leaflets move up and down "either steadily or by jerks, the movements being most marked during bright sunshine."

Catalogues Received.

J. J. Jarmain, Yokohama, Japan;—Bulbs.—John Laing & Sons, Forest Hill, London, England;—Chrysanthemums.—Thomas Meehan & Son, Germantown, Pa.;—Trees, Vines, Shrubs, Fruits.—W. H. Moon, Morrisville, Pa.;—Fruit and Ornamental Trees, etc.—Parsons & Sons Co., Limited, Flushing, N. Y.;—Hardy Ornamental Trees, Flowering Shrubs and Vines.—Pitcher & Manda, United States Nurseries, Short Hills, N. J.;—Hardy Perennials.—Temple & Beard, Shady Hill Nurseries, Cambridge, Mass.;—Trees, Shrubs, Vines, Plants; also, Hardy Perennials.—David G. Yates & Co., Mount Airy Nurseries, 5774 Germantown Avenue, Philadelphia, Pa.;—Hardy Ornamental Trees and Shrubs, Greenhouse and Bedding Plants, etc.